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much misled or mistaken in the form. How much longer would it take before we could represent from memory a form which we had once seen, or, more than that, represent a body in a position that we may never have chanced to see? We will allow that many of the Greek sculptors studied the human form in this way only with magnificent results. But they had constantly before them at home, in the street, and in the agora, beautiful, half-draped models, and in the gymnasium and in the baths perfect nude ones. We are destitute of such opportunities for study, and are forced to shorten if not simplify our means of education. It is necessary for us, besides getting what we can from observation, to study that science whose laws govern the formation of the figure, and to learn how and why the human shape is what it is. This science—anatomy—tells us how man is constructed, how certain motions produce certain shapes, how certain contractions or flexions of the muscles produce certain differences in the outward form. Knowing the ratio of the force of the movement to the curve expressed in the limb, we have gained what long years of patient, careful observation might possibly have taught us. Experi-

ence has shown that those sculptors that have studied anatomy produce better works, more natural, more lifelike, than those who are ignorant of this science. Accordingly, anatomy is now taught in all schools where art is taught successfully. But he who represents the human form must do so in certain positions. He requires to know, therefore, what positions it is possible for bodies to take, and he must know something of mechanics. How frequently have we seen statues, almost perfect as regarded roundness and shape of limb, and expression of features, so posed that the perpendicular line from the centre of gravity fell without the base, and thus in a position which it would be impossible for them to assume. Others are placed in attitudes possible for the moment, but which would cause the figure to fall after that moment. In the celebrated Discobolus, admired on account of the intensity of the exertion, the man must inevitably fall forward to the ground the moment the quoit leaves his hand. Such are some of the errors which a knowledge of mechanics would prevent. It should be the aim of art to be beyond all criticism of this sort.

*(To be continued.)*

## A FEW HAMMER-STROKES.

BY A MASTER-MECHANIC.

THE American, being driven by necessity to look for easy ways of doing his work of all kinds, and taking in such machines and designs as he finds ready made or invented, hampered by no personal or patriotic interest in them as having been made by himself, his father, or even his countrymen, differs in this point from the Old Countryman at home, who is not compelled to make more kinds of machinery, and who has patterns that his father designed,—for which he takes some credit to himself, and to change which seems

to him like denying his father's ghost;—hence he bends himself to agree with the pattern in use; while the American, with an open question before him, yields easily to the influence of the characters, whether of companions, scenery or climate, that surround him, and, in common parlance, "follows the fashion"—a leader of more real merit than reputation.

Of course, the main thing required of a machine is, that it should perform its work well; and if it could perform its work any better than it

does, then the maker has made a mistake in his thinking or his manipulation. But the work may be performed to the highest perfection attainable on this earth, and yet the machine be open to great variation of pattern; and the ornamentation thereof is a matter of much importance to the builder.

Thus, of "machine tools"—on the principle that machinery capable of reproducing its own kind, and also of producing all other kinds of machinery for working in all kinds of material whatsoever, holds the highest rank, as embodying within itself, in making and using, all the mechanical principles, the knowledge, and skill of all other machinery combined—of the machines used in the machine shop, then:—It makes no difference whatever to the working of a machine, whether the legs thereof are round or square, straight or crooked; the legs of machinery in general, being as free and open to fancy in their form as those of the table in your parlor; a certain strength, a certain weight (for steadying the whole) is required in either, but form and proportion are almost unlimited, and in such matters the machinist shows his taste.

Thus, while every machinist, in building a "turning engine," "planer," "slabbing," or "milling" machine, &c., uses straight "V" slides, and runs his arbors in tapered bearings, that can be crowded together as they wear loose, these being essentials for perfect working, yet every builder makes a different pattern of frame, of legs, of hand-wheel, of crank, of spokes to his gear, and pulleys, and of heads to bolts and set-screws, &c., to suit his fancy, or that of somebody he thinks artistic in taste, often a journeyman in his own shop; and this will apply to every tool and machine in the shop. A Boston manufacturer, looking at a planer some six years old in design, remarked, "I would not get

such a machine. I do not like the pattern; it is out of date." He did not object to the "V" slides, to the "screw feed," to the "fast and loose" pulleys, or to any of the essentials of the machine or their arrangement; in all these the machine was acknowledged to be as good as the newest; but, if purchasing, he would look for a prettier pattern—more beauty in the variable portion of the machine.

The Bostonian was no more given to the fine arts than every mechanic in America is.

The moulders of the foundry—at the "ore-bed"—kept sundry fancy patterns of flat trivets, mantel ornaments, &c., which, whenever ladies honored them with a visit to see a "pouring-off," — If you never saw one, Miss, go, by all means. Choose a short day, when the foundry is dark early, when the steam from the "green sand" moulds makes that darkness palpable, when the locations of the workmen are shown by the dull, red, intense glow of the pots of melted iron they carry, when the sparks as the stream runs from the "cupola," outshine "Fourth of July" rockets. Enter into the spirit of the scene if you have strength, and with the memory of it, smile at all the poetic or theatrical hells ever described or delineated—these little trifles, then, were moulded for the lady-visitors' benefit, cast, and presented to them; a custom too gallant to be allowed to fade. In truth, the foundry hands showed full as much taste in fancy ornaments and their use, as did the factory girls, especially those American born, who never saw a strange gentleman looking at their machinery, but they thought it due to his youth and inexperience to pin a tail of "cotton waste" to his coat, and fill his pockets, if possible, with bits of iron, old nails, and odds and ends, limited only by the numbers and resources of the fair contributors, and if from the

window they could see the departed one wear their favors a square or two up the street before some "mean fellow" took them off, they were in extasies; but these same girls often raised flowers in their windows, and pinned no waste to them, however green. But to return to the machine shop, this feeling of "looks," of beauty, governs nearly every hand, and, while fitting up his own private "kit," everything has to take lines of form and ornament agreeing with it, and a skilful foreman will go through a lot of work made by his men, and pick out the men who made the different parts thereof by the mere beauty or homeliness of the portion left to their option.

The "hands" give this question of beauty much thought. A journeyman objected to putting brass in a certain place, as his boss proposed. "The machine was iron and steel; iron or steel would work as well as brass, and look better; he never liked to see brass on iron machinery."

The question of expense in that instance was against the brass; but did not affect the journeyman's pocket, nor was the brass any harder to work than the iron; his judgment rested on his sense of beauty only. It was correct; for although brass is often put on iron, yet, unless called for by the labor to be performed, as a brass or soft metal bearing, a brass covered piston-rod, or some such thing where there is danger of rust, as in marine fire-engines, and locomotive-work, it looks very like cast-iron capitals on stone columns, or artificial flowers in glossy hair.

Several journeymen were once discussing in a machine shop the proper way to ornament a machine. They finished by classifying machines as either "plain," that is, with no ornament, not even curved lines, unless required by the working of the machine—such machinery is very rare; or "moulded,"

that is, with the corners smoothed and the parts rounded, as if worked in clay or other plastic material; or "chiselled," that is, the corners chamfered, but the design made as if of hard material that would hold an edge: either the "moulded" or the "chiselled" admits curved lines and tapering proportions, the moulded often being composed of them only, used for appearance sake. The distinctions then drawn—some nine or ten years since—by those men, they defined as parallel to the expressions, a "moulded form" or a "chiselled lip" in sculpture. It was unanimously decided that the "chiselled" was the most beautiful of the three; that the "chiselled" could be combined with the "plain" better than the "moulded" could, and as some parts of almost all machinery must necessarily be "plain," the "chiselled" was the more universally applicable style of ornamentation; and that to mix the "moulded" with the "chiselled" was the poorest, most corrupt style of all. These journeymen had never been to schools of design, but will the artist or critic improve on the principles then laid down, and which would influence all their work and opinions thereafter? Had there been an embryo Cellini present, would he have been "nipped in the bud?" It is often supposed that some "masters in art" are buried in the "inferior trades," and those who mourn that fact, can seldom see any effect in those trades, of the master working there. The trouble is, perhaps, as much in the eyes of the critic as in the hand of the artistic workman. Those machinists who all require beauty in the machines they are going to use, also study to put on the machinery they sell as much as they can without over-running the limit of cost. But it costs no more to cast a beautifully proportioned or curved pattern than a straight and awkward one of the same

weight. The effect of this is seen in the stands of parlor sewing machines, and such other machinery as is made for the public. In such cases the pattern is used too many times, the eye is wearied by repetition; but, did we never see but a single machine of any one design; most such patterns would be felt to have beauty and merit. This is somewhat the pattern-maker's case. Having made one beautiful pattern or design, he turns to another; the change refreshes him. But, having made what he feels to be a thing of beauty, he soon after hears it condemned by some critic, and thinks that that critic knows nothing of his trade, hence he loses all faith in his criticisms on any subject, and there is a misunderstanding between the two, that results in the artist and critic scoffing at any idea of beauty existing outside of their set, and, on the other hand, the mechanic feels the injustice that he lacks pen and language, or perhaps only the publisher, to refute, and he consoles himself by scorning to be taught even beauty, by those who could not temper a cold-chisel or sharpen a handsaw.

The class of criticism so much in vogue, that, satiated, *blasé*, and discontented, quarrels with all that can now be done, "sitting at the feet of the great masters," or burrowing like a jackal in the graves of the thirteenth century, granting the present workers only a very meagre and vague modicum of praise, couched in such indefinite general terms that no man can suspect himself of being the intended recipient, but which condemns by both wholesale and retail, calling the names and pointing at the items mentioned by it, is unworthy of men who profess to believe in progress, or who—as most of them certainly do—belong to the great mutual admiration society, now living.

Such critics should be put into a more dreamless, a sounder sleep, till they can wake up to the fact that the

spirit of beauty is not dead nor sleeping, but at work as formerly, in the quiet way that characterizes the doing of all good things; and that designs that weary them by repetition are not therefore necessarily bad, or homely, for nature's most beautiful patterns do the same. The fault is in the eye, not the design; for men see things in three different ways: first, the article seldom seen has an advantage from novelty, but is liable to the disadvantage of strangeness; second, the eye, after seeing the same or similar objects, becomes weary and discontented; [third, continual] seeing familiarizes the eye into a state or habit of not seeing at all, of taking things as a matter of course, and noting only changes or defects, as the eye of the experienced proof-reader detects the faults without reading the matter before it. Thus, the cit sees houses so continually that his eye rests on them at ease, and notes only changes or oddities. There he is in the third stage. Put him in the country, and his eye wearies itself of green leaves, more especially if the woods be all of one kind of tree, as in large pine tracts. There his eye is in the second stage. Put him at sea, and, from the shortness of his sojourn there, his eye seldom gets beyond the strangeness of the first period. But take the inhabitant of the country districts; his eye is in the third, or period of confirmed habit, among trees; in the city he soon wearies of houses; and at sea he is in the first stage, strange, while the seaman is in the third stage, of habit on the waves; and though city or country take him at first in the strange period, he soon passes to the second stage, weary of either. But this sounds like metaphysics, and will hardly be considered matter on which the artistic world will care to hear our opinion.

"There is no better deliverance from the world than through Art; and a man can form no surer bond with it than through Art."